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THE EFFECTIVENESS OF DIFFERENT WESTERN YELLOW PINE "LINE" SLASH DISPOSAL METHODS IN INSECT CONTROL

by

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It has been fairly well established that in general western yellow pine slash is not a serious menace as a breeding-ground for primary forest insects. Nevertheless, there are many special entomological problems in connection with slash disposal that require further study. The disposal or treatment of line slash cut in clearings for power lines, roads etc. is one such problem. A start toward its solution has been made by the study of insect development in line slash treated according to five different methods, as outlined by J.M. Miller. The immediate purpose of this study, which was made with the cooperation of the Forest Service, was to determine how far the Forest Service should go in their demands for treatment of power-line slash cut by California power companies. The experiment was limited to trees cut in the lower western yellow pine belt of California during April and May.

Four insects or insect groups attacked the felled trees during the first season:

1. The western pine beetle, Dendroctonus brevicomis Lec.
2. The confused engraver beetle, Ips confusus Lec.
3. Flatheaded borers, principally Melanophila spp.
4. Roundheaded borers, principally Graphisurus spectabilis Lec.

Of these the western pine beetle is the only typically primary forest insect, and so is of most importance. The confused engraver beetle, which is occasionally primary, is the only other insect that needs to be considered in this study.

The five methods of disposal tried and the results from each are given briefly in the following:

1. The trees in this group were felled only, the limbs and bark being left intact. Twenty-five per cent of the total bark area was attacked by the western pine beetle. The brood development of this insect was better than in any of the other slash groups, but much poorer than in standing trees. The emergence of the western pine beetle was greater than the number attacking by 2.6 beetles per square foot.

A fairly good brood of the engraver beetle developed on 45 per cent of the bark area.

2. The trees in this group were felled and the limbs all cleared away, leaving the trunk exposed. Thirty per cent of the bark area was attacked by the western pine beetle and the brood development was poor. The emergence was less than the number attacking by 10.5 beetles per square foot. Only 8 per cent of the bark area was attacked by the engraver beetle.

3. The trees in this group were felled and limbed and the trunks covered with brush. 38 per cent of the bark area was attacked by the western pine beetle. The brood development was better than in Group 2 but poorer than in Group 1. The emergence of the western pine beetle was less than the number attacking by 6.6 beetles per square foot. A fairly good engraver beetle brood developed on 28 per cent of the bark area.

4. In this group the trees were felled, limbed, covered with brush and burned within two weeks. Thirty-two per cent of the cambium area was scorched and most of the rest of the area was unfavorable for bark beetle development. Four per cent of the bark area was attacked by the western pine beetle, with the emergence less than the number of beetles attacking by 3 beetles per square foot. Only 6 per cent of the bark area was attacked by the engraver beetle.

5. The trees in this group were treated in two ways. Four trees were felled, limbed, and the lower half of the trunk covered with brush. The upper half was left exposed. Two trees were felled, limbed, and the lower half covered with brush and burned. The burned and exposed parts had very little bark beetle work, and the covered parts were too moist for good brood development. 22 per cent of the bark area was attacked by the western pine beetle and the emergence was less than the number of beetles attacking by 9 beetles per square foot. A fair brood of the engraver beetle developed on 33% of the bark area.

Table 1

The relation of attack to emergence of the western pine beetle slash groups compared with normal standing trees

	No. of individuals of the w.p.b. per sq. ft.			
	Attacking	Emergence	Increase or Decrease	
			Number	Per cent
Standing trees	27	81	+54	+185
Slash Method				
I. Felled only	17.7	20.3	+ 2.6	+ 15
II. Felled and limbed	13	2.5	-10.5	- 81
III. Limbed and covered	12.4	5.8	- 6.6	- 52
IV. Limbed and burned	8	5	- 3.0	- 37
V. Mixed treatment	9	0	- 9.0	-100

In Table 1 the relation of attack to emergence of the western pine beetle in the different slash groups is compared with the attack and emergence for normal standing trees killed by the western pine beetle during the period of this study. The lack of any "breeding-up" is clearly shown. Even in Group 1, where the trees were felled only, the increase in effective progeny of only 2.6 beetles per square foot would probably be more than offset by the mortality during flight. It is evident that the potential of beetles attacking standing trees is so much greater than that of the beetles that attacked slash that any effect on the total infestation would be toward a decrease rather than an increase.

Either Method 2 or Method 4 is recommended for most situations in the lower western yellow pine belt. They combine a high brood mortality of the western pine beetle with a small per cent of area attacked by the engraver beetle (8% and 6% respectively), and so would improve the forest insect situation in an area rather than create a menace.

Method 2, in which the trees are felled and limbed only, should be used whenever burning of the slash could not be completed within a month from the time the trees are felled. It is most effective on open sites where the logs can be exposed to full sunlight.

Method 4, in which the trees are felled and limbed and the brush burned over the trunks, is the surest method when the burning can be completed within a month after the trees are felled; i.e., before the broods have a chance to develop and emerge; especially on north slopes and in shaded situations where the logs cannot be exposed to direct sunlight.